CLAIMS

I claim:

1. A sealing system for reducing a gap between a tip of a turbine blade and a shroud of a turbine engine, comprising:

a turbine blade assembly having at least one stage formed from a plurality of turbine blades;

a blade ring radially surrounding the turbine blade assembly such that the blade ring may radially expand and contract during operation as a result of thermal expansion or contraction;

a ring segment having at least one ring segment sealing surface positioned in close proximity to at least one tip of the plurality of turbine blades of the turbine blade assembly such that the ring segment forms a gap between the at least one ring segment sealing surface and the plurality of blades;

a spindle fixed to the blade ring at a first end of the spindle and coupled to the ring segment at a second end of the spindle for supporting and positioning the ring segment in close proximity with at least one tip of the plurality of blades; and

wherein the spindle is formed from a material having a coefficient of thermal expansion that is greater than a coefficient of thermal expansion for a material forming the blade ring.

2. The sealing system of claim 1, wherein the spindle is substantially parallel to a radial axis extending from an axis of rotation of the turbine blade assembly.

3. The sealing system of claim 1, wherein the ring segment is supported solely by a single spindle.

4. The sealing system of claim 3, wherein the ring segment is supported solely by a single spindle coupled to the ring segment substantially at a center point of the ring segment.

5. The sealing system of claim 1, further comprising an isolation ring positioned between the ring segment and the blade ring and at least one web coupled to the ring segment for sealing the ring segment to the isolation ring.

6. The sealing system of claim 1, wherein the at least one web coupled to the ring segment extends away from the at least one ring segment sealing surface, is substantially parallel to the spindle, and has a sealing portion at a first end of the at least one web, which is opposite to a second end of the at least one web coupled to the ring segment, that is generally parallel with the at least one ring segment sealing surface.

7. The sealing system of claim 1, wherein the at least one ring segment sealing surface is substantially parallel with at least one tip of at least one blade of the plurality of blades forming the blade assembly.

8. A sealing system for reducing a gap between a tip of a turbine blade and a shroud of a turbine engine, comprising:

a turbine blade assembly having at least one stage formed from a plurality of turbine blades;

a blade ring radially surrounding the turbine blade assembly such that the blade ring may radially expand and contract during operation as a result of thermal expansion or contraction;

a ring segment having at least one ring segment sealing surface positioned in close proximity to at least one tip of the plurality of turbine blades of the turbine blade assembly such that the ring segment forms a gap between the at least one ring segment sealing surface and the plurality of blades;

a spindle fixed to the blade ring at a first end of the spindle and coupled to the ring segment at a second end of the spindle for supporting and positioning the ring segment in close proximity with at least one tip of the plurality of blades;

wherein the spindle is substantially parallel to a radial axis extending from an axis of rotation of the turbine blade assembly; and

wherein the spindle is formed from a material having a coefficient of thermal expansion that is greater than a coefficient of thermal expansion for a material forming the blade ring.

9. The sealing system of claim 8, wherein the ring segment is supported solely by a single spindle.

10. The sealing system of claim 9, wherein the ring segment is supported solely by a single spindle coupled to the ring segment substantially at a center point of the ring segment.

11. The sealing system of claim 8, further comprising an isolation ring positioned between the ring segment and the blade ring and at least one web coupled to the ring segment for sealing the ring segment to the isolation ring.

12. The sealing system of claim 8, wherein the at least one web coupled to the ring segment extends away from the at least one ring segment sealing surface, is substantially parallel to the spindle, and has a sealing portion at a first end of the at least one web, which is opposite to a second end of the at least one web coupled to the ring segment, that is generally parallel with the at least one ring segment sealing surface.

13. The sealing system of claim 8, wherein the at least one ring segment sealing surface is substantially parallel with at least one tip of at least one blade of the plurality of blades forming the blade assembly.

14. A method for reducing a gap between a tip of a turbine blade in a turbine engine and a ring segment forming a portion of a shroud surrounding the turbine blade, comprising:

coupling a blade ring to a turbine casing such that the blade ring may radially expand and contract during operation as a result of thermal expansion or contraction and surrounds the plurality of turbine blades of the turbine blade assembly;

coupling a ring segment to the blade ring using a spindle, wherein the spindle is coupled to the blade ring at a first end of the spindle and is coupled to the ring segment at a second end of the spindle for supporting the ring segment and positioning at least one ring segment sealing surface of the ring segment in close proximity with at least one tip of the turbine blade to form a gap, wherein the spindle is formed from a material having a coefficient of thermal expansion that is greater than a coefficient of thermal expansion for a material forming the blade ring; and

heating at least the ring segment and the spindle, which causes the spindle to lengthen at a greater rate than the blade ring and move the at least one ring segment sealing surface.

15. The method of claim 14, wherein coupling the ring segment to the blade ring using a spindle further comprises using a spindle positioned substantially parallel to a radial axis extending from an axis of rotation of the turbine blade assembly.

16. The method of claim 14, wherein coupling the ring segment to the blade ring using a spindle further comprises attaching the spindle to the center of the ring segment.